ABSTRACT OF THE DISCLOSURE

We describe a new two-step culture method for mass production *in vitro* of erythroid cells from either CD34⁺ (10⁵ cells/mL) or light-density (10⁶ cells/mL) cells purified from the blood of normal donors and thalassemic patients. The method includes (i) culture of the cells in the presence of dexamethasone and estradiol (10⁻⁶ M each) and (ii) the growth factors SCF (50 ng/mL), IL-3 (1 ng/mL), and EPO (1 U/mL). In their proliferative phase, these cultures generated about 1–2 x 10⁷ erythroblasts for each milliliter of blood collected from normal donors or thalassemic patients. They were composed mostly (90%) of CD45^{low}/glycophorin (GPA)^{neg} / CD71^{low} cells at day 7, 50–60% of which became CD45^{neg}/GPA+/CD71^{high} by days 15–20. However, when cells from days 7 to 12 of the proliferative phase were transferred in differentiation medium containing EPO and insulin, they progressed to mature erythroblasts (>90% benzidine^{pos} and CD45^{neg}/GPA⁺/CD71^{nedium}) in 4 days. Because of the high number of erythroid cells that are generated from modest volumes of blood, this method will prove useful in donor-specific studies of erythroid differentiation.

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